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**AQUACULTURE VALUE CHAIN DEVELOPMENT--A STRATEGY
REVIEW FOR MSME 2/BEE**

TASK ORDER NO. 04

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Aquaculture Value Chain Development--A Strategy Review for MSME 2/BEE

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Introduction

The purpose of this value chain development strategy review is to appraise the Cambodian aquaculture value chain assessment of June 2007 developed for USAID funded MSME Project in the light of new developments and progress in the industry in the last almost three years and identify what constraints now exist to the development of the industry and which of them could be addressed through the MSME2/BEE project.

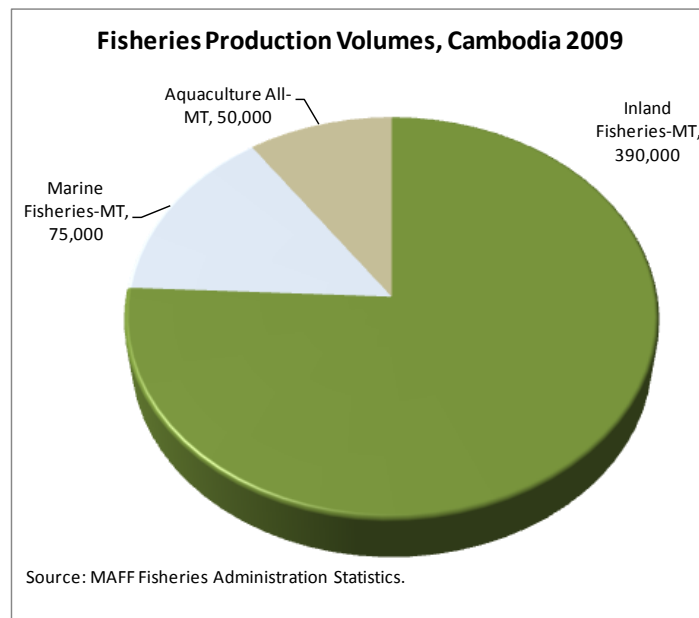
The previous value chain assessment and this assessment looks at the value chain from the view point of micro small and medium scale businesses and the strategies developed are meant to address the strengthening of this sector. For this reason, while it is recognized that rice field aquaculture is important as a food security mechanism, extensive aquaculture practices and constraints have been excluded from this study.

Current Status of the Aquaculture industry viz. the 2007 Assessment

Overview

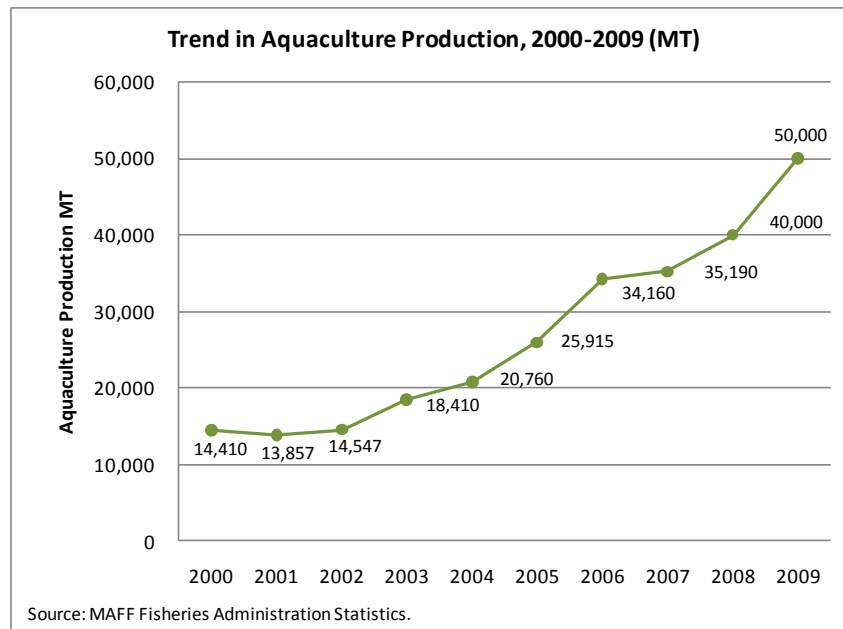
According to data gathered by the Ministry of Agriculture, Forests and Fisheries (MAFF) Fisheries Administration (FiA), Aquaculture production in 2009 stood at around 50,000 MT (both fresh and marine). Freshwater fisheries produced 390,000 MT and marine 75,000 MT as shown in Figure 1 below. In addition, 185,000 crocodiles were produced.

Figure 1: Fisheries Production Volumes Cambodia 2009



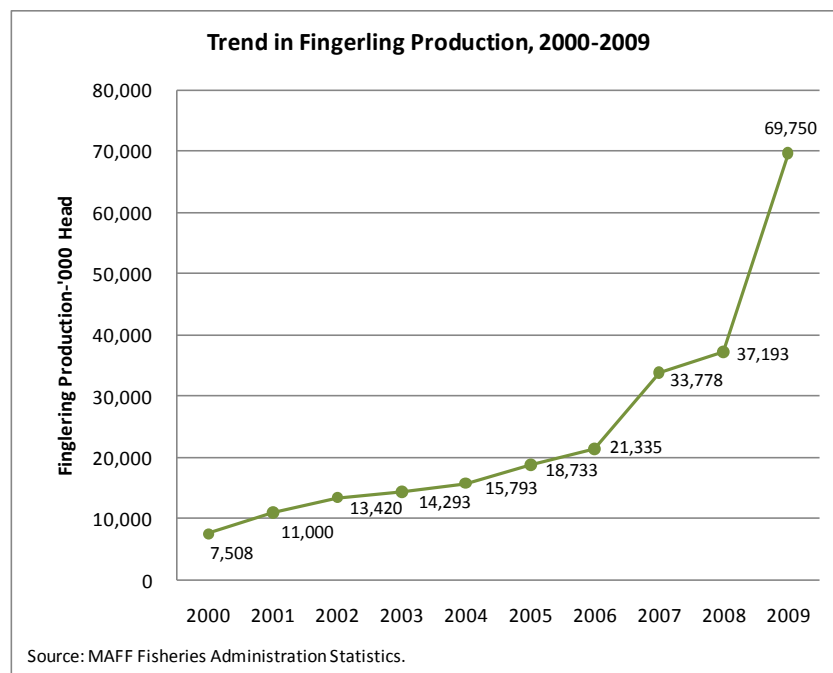
In 2009 aquaculture production in Cambodia has increased by 25% from 2008 production levels and 46% from 2007 levels as shown in Figure 2. This may show the increasing local market sales of aquaculture product, especially during the closed season or due to a shortage of fish, or high prices for alternative meats such as beef or pork. This trend has been witnessed in our practical experience as well over the last three years, although acceptance has come selectively with better management practices.

Figure 2: Trend in Aquaculture Production Cambodia 2000-2009



A review of the FiA aquaculture data also shows that compared to 2007 there has been a 100% increase in the quantity of all aquaculture and mariculture fingerlings produced as shown in Figure 3. This may be a good sign that indicates a growing interest in the fingerling industry.¹

Figure 3: Trend in Fingerling Production Cambodia 2000-2009



¹ It may also just reflect an increase in documentation of fingerling producers.

In an attempt to find out approximately how much of the aquaculture production comes from locally produced fingerlings, the official data on fingerling production (excluding mariculture) was converted to its equivalent aquaculture fish production based on an average 50% survival rate and average weight of 500g/fish. The conversion of fingerlings to equivalent fish production is shown in Table 1 below². This shows that the percentage of aquaculture production coming from local fingerling production has been increasing and is now in the range of 40% and could be even up to 55% (if we account for higher survival and growth rates in Kandal ponds). This is good sign that the industry is moving away from subsistence level production and moving into commercial level, albeit small scale, production. This also tells us that the industry is still heavily dependent on imported fingerlings (for pangasius production) and wild caught fingerlings (for other species).

Table 1: Aquaculture and Fingerling Production 2005-2009

Year	2005		2006		2007		2008		2009	
Item	Fish *	Fingerlings*	Fish *	Fingerlings*	Fish *	Fingerlings*	Fish *	Fingerlings*	Fish *	Fingerlings*
Aquaculture Production (MT)	18,215	14,405	33,595	20,327	33,390	31,708	40,000	37,193	50,000	56,750
Est. fingerling converted to fish production (MT)		5,042		7,114		11,098		13,018		19,863
% fish produced from local fingerlings		28%		21%		33%		33%		40%

* Fish in MT, Fingerlings in thousand head--excluding mariculture fish and fingerlings. Source: MAFF FiA data on aquaculture production with estimate of fingerlings to fish conversion made by this consultant.

Over fishing is a primary concern in Cambodia's freshwater fishery production. Aquaculture production has a significant role to play in easing pressure on the fishery resource. However the use of wild caught fingerlings for aquaculture is of real concern to the depleting fishery resources. This is not new or unique to Cambodian aquaculture. FAO studies document that aquaculturists in many parts of the world still appear to prefer wild caught fingerlings even with the development of advanced hatcheries.³

"However, hatcheries are not always competitive. For example, in Southeast Asia, hatcheries produce catfish fingerlings for sale, but farmers in some countries of the region still prefer wild-caught fingerlings. These are perceived to be of better quality, or are more easily available, as

² Data in Table 1 relates to inland aquaculture and excludes mariculture fish and fingerling statistics which were included in the preceding Figures 2 & 3.

³ The State of World Fishery and Aquaculture Report 2008, Highlights of Special Studies, Use of Fishery Resources as Seed and Feed in Aquaculture, FAO 2009

well as cheaper than those produced in hatcheries. In Japan, both private and state-operated hatcheries have successfully reproduced the Japanese yellowtail (*Seriola dummerili*), but farmers still prefer fingerlings from the wild.”

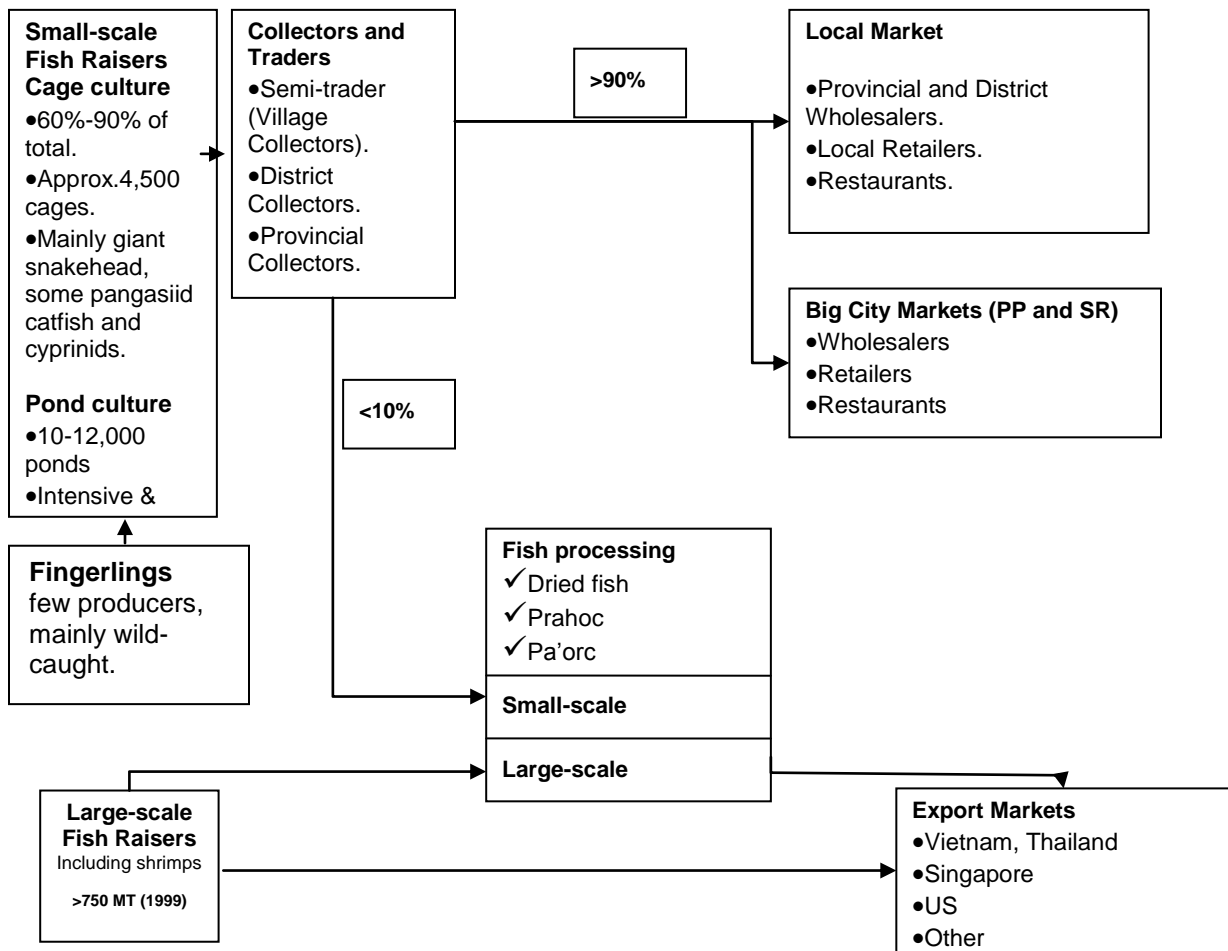
The Cambodian government has now placed aquaculture production on a priority in the fishery sector to off set over fishing and to improve food security and nutrition. Additionally Fishery Administration of Cambodia has recognized 166 of the fingerling producers in Cambodia with potential for development.

Crocodile production has increased in the last two years (although not to the 2003-2005 levels) and is a significant player, as it competes for low-value fish resources around the Tonle Sap area.

Industry Structure

The aquaculture value chain in 2007 is shown in the diagram below. Production was characterized by mainly extensive and subsistence level fish raisers. Village collectors were predominant in the trading network and most fish were sold in the immediate villages.

Figure 4: Aquaculture Value Chain 2007 Diagram



A synopsis of perceptions in the aquaculture value chain in 2007, is extracted here from the consultant's 2007 Value Chain Assessment Report:

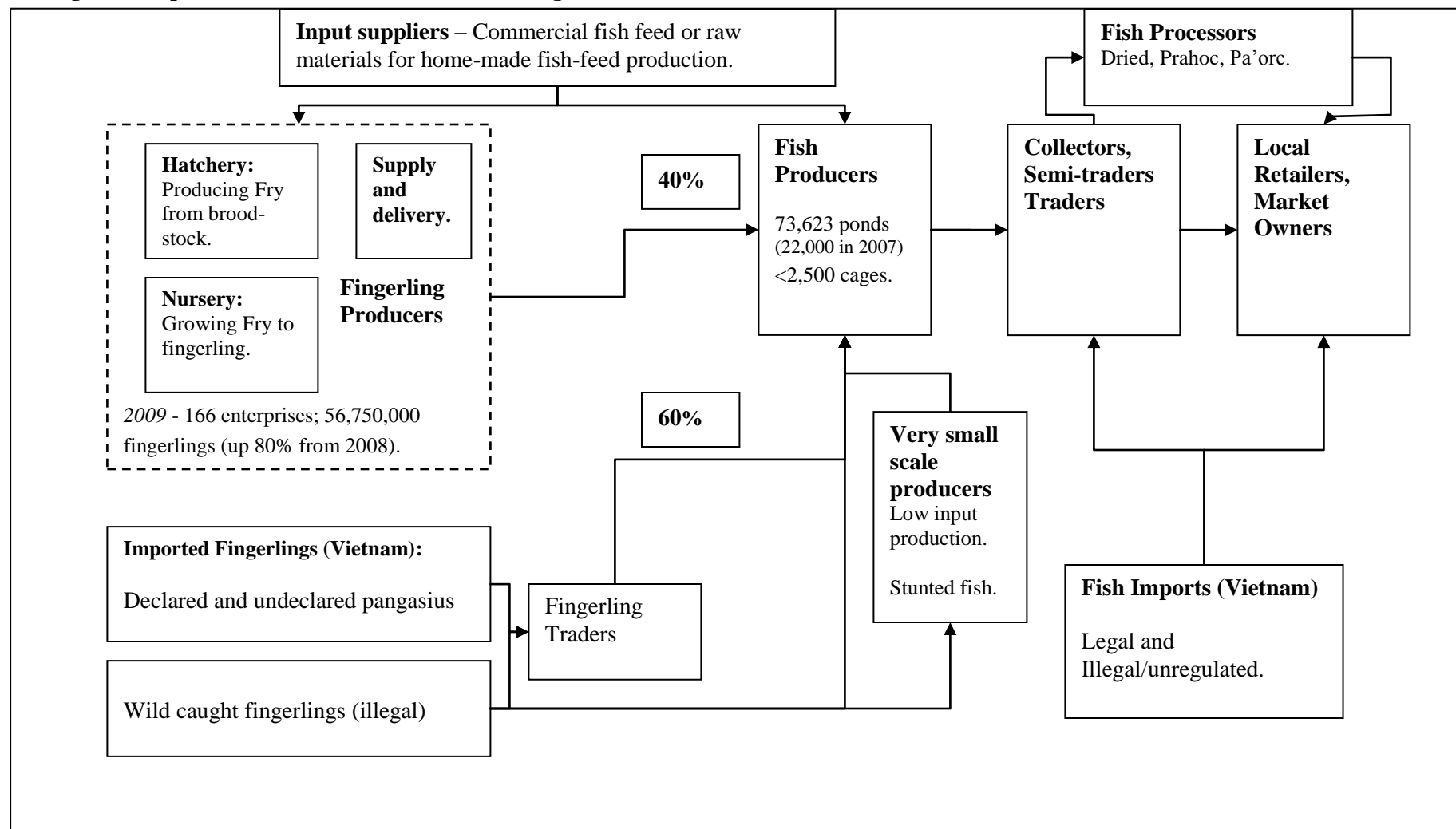
1. Consumer preference for wild caught rather than aquaculture product.
2. Consumer preference for local fish over fish from other provinces, due to taste, texture and appearance.
3. Distinct preference for fresh fish over ice or cold storage. The price differential for live fish over dead fish is 50% to 60%.
4. Small daily market volumes and low geographical dispersion of product.
5. No effective cold chain to improve fish shelf-life and keep them looking fresh.
6. Limited commercial excess.
7. Aquaculture product is targeted for April/May season due to the difficulty for small-scale producers to compete on price with wild catches. Cage-cultured snakehead is one of the few products able to compete on year round basis.
8. Very little aquaculture product goes to fish processing and the Cambodian fish processing industry is very small.
9. Producers are averse to obtaining capital loans for aquaculture development due to high interest rates (around 42% per annum) and sense of shame in potential to lose assets. This inability to borrow is compounded by poor technical skills and weak business models. A borrower is seen as being down-and-out rather than an astute businessman.
10. Producers have little if no experience in self-managed business credit schemes.
11. High level of 'support' to the value chain by NGOs has inhibited natural business development and pulling out by the NGOs without an appropriate exit strategy has crippled the value chain in some provinces.
12. Heavy dependence on wild caught fingerlings.

In order to move fish raisers towards commercially viable production the MSME project worked with pilot groups of keen aquaculture business people in the selected provinces to show that aquaculture can be a significant income source and a viable and sustainable family business when done correctly. The main focus was to engage with people willing to improve the business, provide an understanding of technically correct aquaculture techniques and apply them in the local context and then show the positive demonstration to others. The result provided an approximate 300% increase in pond productivity and produced some good replicable small scale business models. As the business of aquaculture took shape it became not a supplementary income but the primary income source for the participating project clients. Value chains were also strengthened as it now became viable for input suppliers, fingerling producers and bigger traders to participate. Increasing pond productivity brought in bigger traders to places like Batheay in Kompong Cham and a corresponding increase in investment capacity.

The aquaculture value chain in Cambodia in 2009/2010 as it applies to medium and small scale producers, is illustrated in Figure 5 below. As in 2007, large scale producers produce their own fingerlings, import feed directly and process their own product for identified markets.

The value chain components and their present status are discussed in the sections below. This consultancy identified where constraints in the value chain occur and how the MSME Project may support the creation of mechanisms that can improve the sector in a way that allows for innate and sustainable business growth. The proposed strategies and activities are meant for the project, and recognize that while a project of this nature cannot solve or even involve itself in all of the value chain constraints, there are few critical pieces of the business that it can help put in place. These mechanisms build on the current successes of the project's work in the aquaculture value chain and will assist in increasing the outreach of the project to have an impact on a far wider network of producers. Appendix 1 discusses some critical competitiveness information that needs to be obtained and assimilated through the regular international exposure visits.

Figure 5: Aquaculture Value Chain 2009/2010 Diagram



Production

Pond Culture

In the wider Cambodian context as in 2007, the industry is still characterized by a large number of small producers, although the numbers of ponds has grown significantly. In 2009 there were nearly 50,000 ponds (and 1,300 cages) producing just 50,000 MT of fish.

Table 2 below shows the significant growth in the number of ponds, although the average pond size is still very much below the minimum commercially viable pond size of around 500m².

Table 2: Pond based Aquaculture 1997 to 2009

Years	Number	Area (m ²)	Avg. pond size
1997	3,455	2,387,872	691
1998	6,100	1,399,000	229
1999	157,845	3,184,085	20
2000	7,100	2,946,452	415
2001	7,100	2,946,452	415
2002	10,021	2,512,647	251
2003	10,962	6,122,870	559
2004	11,484	2,494,309	217
2005	36,456	7,215,280	198
2006	33,564	2,575,980	77
2007	22,039	2,253,703	102
2008	N/A	N/A	N/A
2009	49,862	6,931,692	139

Source: MAFF FiA Statistics.

On average a commercially run pond of around 500m² in Cambodia can produce 15-30 MT per season. However most of Cambodia's small and medium scale aquaculturists still produce only 1-5 MT/500m². Many producers in the provinces get much less than 1 MT. Even assuming an average production per year of 10 MT/500m², or 20kg per m², potential production of aquaculture from the presently developed ponds is around 140,000 MT, looking much closer to the Cambodian Government's 2020 target of 180,000 MT. Promoting an increase in pond productivity is key not just to meet demand but also to manage costs and become a viable business with capacity to reinvest.⁴

Conversely Cambodia's big aquaculture producing neighbours are not talking of square meters of ponds but hectares of ponds! That is not to say there are no big investments in aquaculture in Cambodia. Discussions with Fisheries Administration officials showed that around 14 big companies operated in Kandal province for commercial aquaculture production or processing. In total around 30 big companies are in business for fishery exports. There appears to be growing interest among investors in Vietnam and China to invest in aquaculture and mariculture

⁴ A USAID sponsored Aquaculture Business Handbook prepared by Mr. Kimhor Proum and Ms. Merrilene Peramune for the Cambodia MSME project in 2008 showed how small scale businesses can start and grow to achieve these productivity targets. The book included practical examples from rural Cambodian aquaculturists who had implemented these best practices with success.

production in Cambodia. However the expansion of the big business sector has not had a spill over effect to even the medium scale industry. There are no out grower systems and no linkages between the large players and the rest of the industry. Medium scale producers are still producing only for local markets during the closed season and the ‘wedding season’ (when there is an increase in the demand for carp). Small scale producers access local market supply chains. One important aspect to consider will be how the linkages between VC players, even among producers, can be strengthened to develop good business partnerships.

Cage Culture

Cage culture has declined significantly with only 1,306 cages reported in 2009 compared with around 2,500 cages at end 2007, and significantly higher numbers (over 4,000) in the preceding years. This is largely due to the ban on snakehead culture, although visits to provincial and Phnom Penh wet markets indicate that snakehead is a predominant fish and sold year round. It is still the only aquaculture product that has a steady year round fresh fish market in Cambodia. In 2007 nearly 60-90% of aquaculture in Cambodia was cage cultured snakehead. A NACA sponsored study⁵ also suggests that:

“While the aim of the ban is biodiversity conservation by mitigating the overexploitation of the small fish species of particularly the Tonle Sap (which are used as feed for the cultured fish) it has also caused economic hardships to the thousands of cage culturists who have few livelihoods options. It has also deprived the local economies and the national government a source of income because the species fetched a relatively high price in the local market with a significant export to neighboring countries such as Thailand, Singapore and Malaysia.”

Due to the strong market preference for snakehead fish and the government ban on snakehead production, much of the snakehead production has gone undeclared, or stopped completely. The reason for the ban was to reduce pressure on low value fish consumption by snakehead farms in order to improve access to fish for marginal populations. However, due to the high market pressure it appears that undeclared(?) snakehead imports from Vietnam have increased. Although producers in Vietnam are said to feed the snakeheads on commercial fish feed formulations, a lot of Cambodian low value fish is exported to Vietnam. It is apparent the Cambodian government too has recognized this issue and is looking at ways to promote snakehead culture using commercial fish feed.⁶ The time may be opportune to engage with the government in a dialogue on this issue, and to bring back into regulated production this very viable indigenous species with a supporting input network.

⁵ TOT for Strengthening Capacity of Smallholder ASEAN Aquaculture Farmers for Competitive and Sustainable Aquaculture, Case Study – Channa Stratia Practice in Cambodia, NACA, August 2009

⁶ As discussed at the meeting with H.E. Limsong Deputy Director General of Fisheries Directorate on 5th April 2010.

Input Supply

Fingerlings

Although fingerling production has increased since 2007, it is still far from meeting the requirements of aquaculture producers. Since NGO financed fingerling producers move in and out of the business, huge gaps are left in the value chain. This situation is less widespread now than in the last five years, as the sector has a growing understanding of the potential damage of direct intervention. Attempts to force a breakdown of fingerling suppliers' activities by some projects into separate enterprises, each specialized into either hatchery, nursery, or trade; has failed. Instead we saw nursery people subsequently backward integrate into hatchery and many purely hatchery businesses shutting doors. Since production volumes are yet small, fingerling producers still find it viable to carry out all three functions, even making delivery to clients, also used to keep in touch with clients' requirements and canvass new business. Two distinct gaps have emerged in the development of vital areas in this value chain link:

- a). The lack of business development information for fingerling suppliers that would show them how to apply technical information, invest, keep records and grow in a way that will make a profitable long term business. This makes them dependent on NGO projects to develop and sustain their businesses.
- b). The lack of even moderately advanced technical information on fingerling production. The costs of obtaining such training are very high and require overseas travel. There is a need to share best practices in fingerling production, as applied in the Cambodian context, and provide information on the culture of high value species.

Numbers of recognized fingerling suppliers in each province and their production for 2009 are shown in the Table 3 below.

Table 3: Production of Fingerlings 2009 by Province

Province	No. of Fingerling Producers	Production for 2009
Phnom Penh	1	2,000,000
Kandal	4	11,730,000
Prey Veng	19	4,040,000
Takeo	30	15,000,000
Svay Rieng	17	6,565,000
Kompong Speu	15	3,840,000
Kompong Cham	11	3,080,000
Kratie	7	200,000
Steung Treng	4	190,000
Kompong Thom	6	260,000
Kompong Chhany	5	1,000,000
Pursat	4	830,000
Battambang	16	1,500,000
Banteay Meanchey	7	2,170,000
Odor Meanchey	3	850,000
Siem Reap	7	2,770,000
Rattanakiri	4	265,000
Mondulokir	1	110,000
Prey Vihear	5	350,000
Kampot	24	12,000,000

Source: MAFF FiA Statistics

Stunted Fish

An interesting development has been the advent of very low input producers of stunted fish. They original emerged from freshwater fishers who tried to grow out small sized catches or accidental (?) fingerling catches, which would have otherwise become low value fish. The fish were left to grow in small ponds with minimum extra feeding and then sold to aquaculturists. Some medium scale aquaculturists prefer using these fish as they are only a little more expensive than fingerlings, and since they are already mature, they grow fast on commercial feed and are ready for market in a very short time. The survival rate is much higher due to their maturity. If the stunted fish suppliers are allowed to develop unchecked, as they are now, they will cause tremendous pressure on wild fish resources. However, the prospect exists to channel them into the aquaculture value chain by creating opportunities for them to become potential outgrower links between fingerling suppliers and medium scale producers. This presents an opportunity for the project to work with the FiA, dialogue with these stunted fish producers (who are recognized even in the baseline survey) and create a business opportunity for linking these two groups in a sustainable manner.

Feed

The more widespread application of correct feed and feeding techniques has seen the market for feed supplies develop over the last three years. Commercial fish feed from Vietnam is available and used by medium scale producers. Small scale producers now cook their own fish feed. Feed cost is of concern when raw material prices increase. A potential development here is the local production of fish feed for small/medium scale producers.⁷ The cost of locally produced feed is around 1,800 riel per kg without fuel and pelletizing costs, compared with 2,080 riel for the Vietnam feed or about 10% less than prepackaged mixes.

End Markets

Fresh Fish Markets

Local fresh fish markets are still the principal end market for Cambodian aquaculture. Due to the difficulties in transportation across provinces during the closed season and the lack of suitable transportation facilities for perishable commodities, aquaculture product is still largely sold closer to production. Exports of aquaculture are still very small and confined to a few large companies. The greater part of fresh and processed fish exports of around 30,000 MT (2009) come from the capture fishery. Improving Cambodia's competitiveness in local or international markets will require investment in processing, building quality systems, experimenting with out-grower networks and investing in certification.

As discussed in the 2007 value chain assessment report, local end markets still prefer wild to aquaculture fish and during the fishing season (open season) it is very difficult for aquaculture production to compete on price with the capture fishery. During the closed season aquaculture takes second place to pork consumption. Nevertheless, qualitative assessment of market performance in the provinces showed that Cambodians are increasingly recognizing fish as a healthy food choice. Acceptance of aquaculture product in local markets appears to be increasing, especially with the improved production methods. Strengthening marketing, market networks and market information is a priority.

There is still a strong preference for live fish, and fresh fish over frozen fish. This preference has enabled the Cambodian fish supply to resist competition from excess production from neighbouring Vietnam. Traders and retailers should be encouraged to develop, and even highlight or enhance, the live and fresh fish preference as a strategy to maintain markets. If Cambodia's fish industry actors could form a fisheries marketing association, they could begin to develop a branding and marketing strategy. However at the lower end of the market large quantities of frozen undeclared fish of piranha varieties are posing a threat to local production. This will become a threat to the rice field fishery and small family fishers. If the fish coming are posing a threat to the natural fishery resource, or have the potential to do so (if they are found to come in live), then there will be adequate evidence to instigate stringent action against these illegal imports.

⁷ This is more complicated than for pig feed as fish feed requires cooking and therefore stabilizing before commercial distribution.

Strengthening retail markets for aquaculture is now a matter of creating consumer awareness and encouraging retail network intensification. This can best be undertaken through value chain cooperative action. Activities relating to retail market strengthening have already commenced in the project.

Processed Products

As in 2007, processed products are still limited to the traditional dried fish, Prahoc and Pa'orc. There is potential in this value chain to develop markets for fillet and breaded fish products, which may be supplied by medium and large scale producers especially in Kandal and Siem Riep.

Exports

Based on information from MAFF, Cambodia's fishery exports were around 30,000 MT in 2009 and are expected to be around 24,000 in 2010. The majority of export fish comes from freshwater and marine catches. Data on aquaculture exports is not available. Some of the significant aquaculture exporters are Lian Heng Co., Chhay Heang Group and Chanthou Meanchey Group. Cambodia's fishery exports in the last six years to China, Malaysia, Thailand and USA are shown in Table 4 below. Other important markets are Australia, South Korea, Hong Kong and Singapore. Mariculture exports are expected to increase significantly by 2012 with Japan's recent investment in a breeding and culture plant in Sihanoukville.

Table 4: Total Fish and Seafood Exports to China, Malaysia, Thailand and USA (in MT)

HS Code	Description	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
03	Fish and Seafood	7,982	7,481	5,860	4,796	4,113	5,555
0301	Fish, Live	261	233	274	233	100	6
0302	Fish, Fresh or Chilled (No Fillets Or Other Meat)	2,257	2,379	1,401	2,007	1,265	1,445
0303	Fish, Frozen (No Fish Fillets Or Other Fish Meat)	27	16	193	1	24	0
0304	Fish Fillets & Other Fish Meat, Fresh, Chill Or Frozen	1,307	1,712	1,534	1,195	964	2,188
0305	Fish, Dried, Salted Etc, Smoked Etc; Ed Fish Meal	1,809	1,578	1,112	934	1,351	1,445
0306	Crustaceans Live Fresh etc, Cooked etc.;	2,295	1,598	1,053	347	356	283
0307	Molluscs & Aqua Invertebrates Nesoi, Live Etc.; Flour etc	153	66	415	195	102	191

Source: Global Trade Atlas

Information Flows

Technical and Business Information

Provision of technical and business development services are an integral and missing link in this value chain. Although some technical information is provided through projects to specific fingerling producers or fish raiser groups, and sometimes through the FiA, there is absence of a structured mechanism for providing aquaculture business development at grass roots level. And there is possibly hesitation by the government in promoting aquaculture.

With the development of the aquaculture value chain, fingerling producers have emerged the primary candidate for technical information flows. Since fingerling production, hatchery and nursery management requires some degree of technical know-how, fingerling suppliers are best placed to disseminate this information down through the value chain. This is really filling in for the absence of a more advanced extension system, which is provided by the State in some economies.

Nevertheless, dissemination of technical and business development information and services through fingerling producers can have far greater outreach and impact than even a good extension system, as it becomes part of the business transaction. Provision of technical and business development has not yet become a common embedded service in this sector and there is scope to do so. Especially so now that 166 fingerling producers in 22 provinces have been recognized by FiA they may be trained and developed into a good and certifiable channel for aquaculture business information.⁸

Market Information

At present, the trader is the primary channel for market information flows. The Project is now working towards having aquaculture product prices available through MAFF's agricultural market information system (CAMIP) on mobile phones. Retail market strengthening activities of the project will/should also deal with creating linkages for information flows on quality and market requirements from retailers through to producers.

Business Enabling Environment

Understanding Regulations

Unlike in 2007, when the regulatory environment for aquaculture business was scarcely developed, now relevant 'prakas' and policies are in place for many of the important aspects. Nevertheless there is no clear system for aquaculture businesses to find out what regulations pertain to their business and what kind of paperwork is necessary beforehand. Among other reasons, poor understanding of regulations, especially those concerning the transport of fish during the closed season, have resulted in high transaction costs and retarded market development.

⁸ The project is now working with 16 of these fingerling producers.

Opening Dialogue between Producers and Policy Makers

One key to stabilizing the Business Enabling Environment (BEE) for aquaculture is opening up avenues for dialogue between producers, policy makers and supporting institutions. To some degree, the Cambodia MSME project has helped open up relationships at provincial levels in some provinces. However, much more effort at provincial and national level will be needed to position Cambodia's aquaculture industry to grow at the required rate, and produce the right quality, while protecting itself from being swamped by its huge aquaculture producing neighbor, Vietnam. Cambodia needs a national aquaculture fisheries strategy developed and owned by the private sector.

Opportunities for Business Membership Organizations

As the aquaculture business grows into a primary business for many producers, the time is now right to expand the concept of business membership organizations. Some of the key business issues that need addressing are:

- a). improving market perceptions of aquaculture product.
- b). improving productivity and quality through increased adherence to technically correct aquaculture methods.
- c). access to good quality seed.
- d). managing feed prices.
- e). developing market supply linkages.
- f). securing access to credit.
- g). Marketing

Small and medium scale aquaculturists are far more likely to succeed in these matters as a group than as individuals.

Summary of Key VC Constraints

Constraints are grouped and the relevant MSME Project Component is included (C1= Component 1-Strengthening Value Chains; C2= Component 2-Private Sector Voice; and C3= Component 3 Public Sector Strengthening).

Table 5: Summary of Key VC Constraints (Part 1)

VC Dimension	Constraints	Component
Input Supply		
Fingerlings	Use of/dependence on wild caught fingerlings.	C1
	Under development of fingerling supply.	C1, C2
	Fingerling production unstable due to lack of understanding of business and technical management and over dependence on NGO support.	C1, C2
Feed	Insufficient use of proper feed techniques and high cost of commercial fish feed.	C1, C2
Feed materials	High fluctuations in feed material costs.	C1, C2
Production		
Pond Culture	Low pond productivity even in intensive aquaculture.	C1
	No widespread application of technically correct aquaculture.	C1
	Lack of linkages between producers to resolve technical and business constraints.	C1, C2
	No outgrower systems or connection between small and medium scale producers.	C1, C2
Cage Culture	Lack of commercial fish feed for cage culture of snake head.	C1
	Lack of commercial fish feed for cage culture of snake head.	C1
	No regulatory approval for snakehead culture.	C3

Table 6: Summary of Key VC Constraints (Part 2)

VC Dimension	Constraints	Component
End Markets		
Fresh Fish	Insufficient retail market infrastructure to handle fresh wet products hygienically.	C1
	Lack of refrigerated transportation.	C1
	Insufficient promotion and acceptance of aquaculture product.	C2
	High cost of transportation levies across provinces.	C2, C3
	Impact of illegal fish imports from Vietnam.	C3
Processed Fish	Few products.	C1
	Lack of product development to cater to big city markets.	C1
Exports	Mainly freshwater capture fishery.	C1
	No out-grower schemes even with medium scale producers.	C1
	Limited to a few large companies.	C2
Information Flows		
	Lack of structured approach to technical information outreach.	C1
	Lack of supporting networks to drive a concerted effort towards better business outcomes.	C2
	No widespread knowledge of best practices so farmers have no awareness that their practices can be improved.	C1, C2
	Market information networks not developed.	C2
	Insufficient use of trust mechanism between consumers and retailers to promote aquaculture products.	C1, C2
Business Enabling	Environment	
	Lack of knowledge about regulations concerning the aquaculture business, especially those concerning transport and marketability which must be addressed at the outset of production.	C3
	Lack of organization among businesses to support business and technical needs, credit and reinvestment.	C1, C2

Strategies and Activities for VC Constraints which may be effectively addressed by the MSME Project⁹

Strategy 1: Structure and Institutionalize Business Information Outreach and Technical Support

Encourage Business and Technical Information Services

Task: Develop an Aquaculture Business Training Module for use by Fingerling Producers as an embedded service and conduct TOT with support/recognition from FiA.

Objective:

1. Develop easy to use training materials and help train fingerling producers recognized by FiA (166 producers at present) to be certified aquaculture business trainers.
2. Support the on-going dissemination of business and technical training material to a wider network of aquaculture producers through these fingerling producers, by assisting in setting up and providing feedback for the initial training sessions.

Strengthen Retail Market Information Networks

1. Prepare consumer and retailer awareness materials to include benefits of aquaculture, how to select good aquaculture products, market hygiene, fish handling and storage.
2. Facilitate the organization of retailer/trader business membership associations and forums to improve market infrastructure and link with producers.

Improve Media Use in the Dissemination of Technical, Market and Regulatory Information

Train FiA and related institutions on effective media use for regular dissemination of aquaculture related information.

Test CAMIP service applications to aquaculture.

⁹ Includes activities already scheduled as an indication of their relevance within the overall strategy. The proposed new activities are supported with more details.

Improve Access to Technical Know-how at Grassroots Level

Assist in creating a dialogue between FiA and the Ministry of Education to introduce aquaculture technical skills into the school curriculum as a practical technical skill.

Strategy 2: Improve Viability and Performance of VC Players

Fingerling Production

Develop a Fingerling Producers Technical and Business handbook.

- Objective:
1. Encourage new investment in the fingerling supply business.
 2. Assist existing businesses to improve viability and management and grow their supply and outreach.
 3. Assist in improving know how in the culture of high value species and in improving quality of fry and survival rate.
 4. Help to close the life cycle and improve productivity through artificial propagation.

Feed Production

Study the feasibility of small-medium scale commercial fish feed markets and if feasible assist in organizing fish feed producers with FiA cooperation or RUA and support.

Fish Production

Monitor productivity improvement among top 5% of existing clients (50 producers) and provide feedback to client base on the application of technically correct aquaculture.

Areas to be monitored: fingerling survival rate, cost of pond preparation, production/m², cost of production.

Objective:

1. Encourage clients to work towards self-set productivity targets and business growth goals.
2. Encourage record keeping and evaluation. Share the outcomes of the application with a wider network of clients to encourage business growth.
3. Set best business practices outcomes for new and existing small and medium scale businesses.

Strategy 3: Strengthen Networks between Producers to Address Business Issues

Support existing business membership organizations and help set up new BMOs¹⁰

Assist value chain players to support each other for:

- a). improving market perceptions of aquaculture product.
- b). improving productivity and quality through increased adherence to technically correct aquaculture methods.
- c). access to good quality seed.
- d). managing feed prices.
- e). developing market supply linkages.
- f). securing access to credit through a series of facilitated working group sessions.

Assist the development of business linkages and outgrower schemes among producers through networking

Explore the possibility of moving low input stunted fish producers to link between fingerling suppliers and medium scale aquaculturists.

Encourage Dialogue between producers, policy makers and supporting research and development institution

1. Use provincial and national business forum mechanisms to assist producers, regulators, policy makers and supporting institutions to understand the VC constraints (suggest the project team make a presentation on the VC, constraints and opportunities and facilitate a discussion on the competitive positioning of Cambodian aquaculture business and to help develop a practical framework for developing the aquaculture industry.
2. Assist in setting up a forum to discuss the future of cage-cultured snakehead fish¹¹.

¹⁰ Referred to by the project as community working groups but could transit to more formal business associations registered with FiA in the future.

¹¹ May drawn on August 2009 NACA workshop with FiA

Appendix 1

Regional competitiveness information which may be obtained from international exposure visits

In developing Cambodia's aquaculture value chain, we need to recognize that as we get more serious about the business of aquaculture we need to understand, adapt to and learn from the competitive environment in which the industry will then operate. This was not that important in moving from subsistence to intensive aquaculture, but now becomes critical in supporting a sustainable aquaculture business. Although we are well aware that Cambodia's neighbors Thailand and Vietnam have huge aquaculture industries and are well supported by State sponsored extension and development systems, many possible lessons from these industries may go unrecognized when Cambodian aquaculturists are confronted with the disparity in the production system. It is recommended that as international exposure visits are organized they be used to glean some of the following business competitiveness information.

a). Cost structure of same size firms

Although we may not be able to compare costs with large investments it is useful to include in the itinerary several visits to rural small scale businesses to compare notes on costs and challenges.

b). Industry Structure – percentage of large, medium and small firms.

c). Input interfaces and cost.

d). Market Information – how markets are developed, how are new products introduced to the market.

e). How are small scale producers linked to markets and the cost of accessing markets.

f). Structure of the farm to market interface.

g). How consumer awareness and loyalty to local products is developed – activities that helped.

h). How do small producers link to technical and business development.

Information should include how extension information is channeled in a cost effective way.

i). Experiences with Public Private Dialogue – how did business associations prepare, present and advance BEE issues.

j). Role of associations and how they add value to members' business. Do members pay a fee, if so what benefits are provided for it? How are new members attracted? How does the association support the cost of its activities?

This information could later be discussed and assimilated through a facilitated work session between participating government and private sector people as well as other relevant stakeholders who will add value. Lessons from these may be disseminated through business membership organizations and working groups to the wider industry.